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COATING FORMING DEVICE

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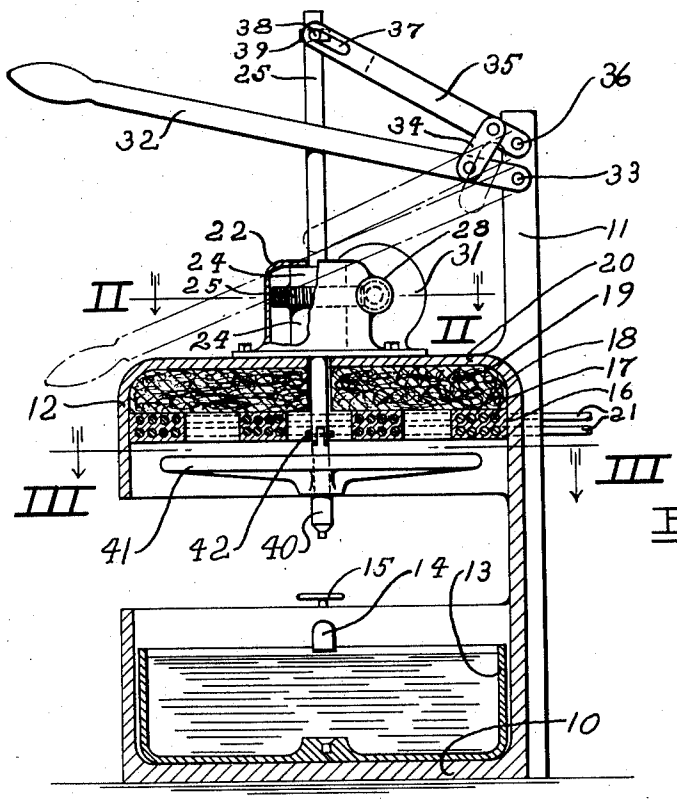


Fig. 1.

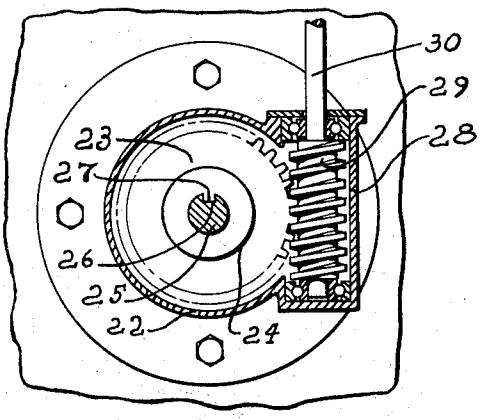


Fig. 2.

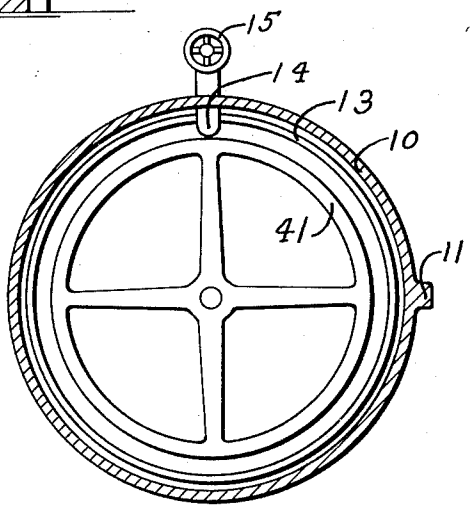


Fig. 3.

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COATING FORMING DEVICE

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2 Claims. (Cl. 91—55)

This invention relates to an improved machine for forming coatings on metal articles. More specifically, the invention relates to a machine of this character for forming on ferrous metal articles coatings comprising material such as hard rubber which require a heating or baking treatment.

The main objects of the invention are to provide a device of this kind which is adapted to conveniently subject an article to alternate immersions in a coating bath and heat treatments so as to successively build up superimposed layers of coating material; to provide means in a machine of this character for rotating the articles during the heat treatment and while they are immersed in the coating bath; to provide a coating forming device which is particularly adapted to coat metal steering wheel cores; and to provide means for inductively heating such articles which may be located in close proximity of the coating bath without causing ignition or excessive evaporation thereof.

An illustrative embodiment of our invention is shown in the accompanying drawing, in which:

Fig. 1 is a vertical sectional view of a coating machine which embodies my invention.

Fig. 2 is a horizontal sectional view taken on the line II—II of Fig. 1.

Fig. 3 is a horizontal sectional view taken on the line III—III of Fig. 1.

In the form shown, our improved coating machine includes a hollow base portion 10 of cylindrical shape having an open upper side and an upright standard 11 on which is provided a hollow casing 12, also of cylindrical shape. The casing 12 has a lower open side which is spaced from and registers with the open side of the base portion 10. Mounted in the base portion 10 is a coating bath receptacle 13 into which a suitable coating composition may be conveniently discharged from a spout 14 under the control of a valve 15.

In the interior of the casing 12 is provided a heating device which, in the form shown, includes a pancake type induction coil 16 having two concentric pancake rings. The pancake coil 16 includes a plurality of turns of wire 17 embedded in a suitable insulating composition 18 by which the turns of the coil are spaced apart. A layer of heat insulating material 19 is interposed between the upper end 20 of the receptacle 12 and the pancake coil 16. Terminals 21 of the coil 16 are electrically connected with an alternating circuit (not shown).

Mounted on the top of the end wall 20 of the casing 12 is a gear housing 22 in which is confined a worm gear 23 having hub sections 24 extending beyond its respectively opposite sides. The extremity of the lower hub section rests upon the top side 20 of the casing 12 and the extremity of the upper hub section is located within close proximity of the inner side of the top of the housing 22. A vertically shiftable bar 25 extends through the worm gear 23 and hub sections 24, as illustrated in Fig. 1. This bar is provided with a spline groove 26 into which extends a spline 27 formed on the gear and hub sections 23 and 24, respectively. The housing 22 is provided on one side with a chamber 28 in which a worm 29 is journaled. The worm 29 meshes with the teeth of the gear 23 and it is carried on a shaft 30 of a motor 31 which is also mounted on the top side 20 of the casing 12. This mechanism is adapted to rotate the bar 25 during operation of the machine.

Our improved coating machine is provided with actuating mechanism which is adapted to reciprocate the bar 25 vertically during rotation of the bar about its longitudinal axis by the motor 31. This actuating mechanism includes a lever 32 which is pivotally mounted at 33 on the upright standard 11. The lever 32 is pivotally connected by a link 34 with a lever 35 which is pivotally mounted on the upright standard 11 at 36. Formed at the free end portion of the lever 35 is an elongated slot 37 in which is received a pin 38 of a collar 39. The collar 39 is journaled on the upper end of the bar 25 and fixed against axial movement relative thereto.

Detachably mounted on the lower end of the bar 25 is an adaptor 40 for detachably securing a steering wheel core 41, or other metal article, to the bar. The adaptor shown includes a metal arbor having a neck portion receivable in the passage of the hub of the steering wheel core and an enlarged head portion for engaging an end of the hub of the core. The arbor 40 is detachably secured to the lower end of the shiftable bar 25 by a pin 42.

In order to prevent the loss of electrical energy and heating of the structure of the machine, all parts thereof closely associated with the coil 16, such as the casing 12, standard 11, and bar 25, may be formed of nonmagnetic metal, such as aluminum.

In operation, the coating bath receptacle 13 is filled through the spout 14 with a suitable composition, such as a hard rubber coating composition of the character set forth in our co-pending

application Serial No. 615,764. The device may also be used to advantage in forming baked coatings of enamels or other surfacing materials on metal articles.

In forming hard rubber coatings on metal articles, such as steering wheels, it is preferable to first bring the steering wheel core into the field of the coil 16 by turning the lever 32 upwardly so as to heat the steering wheel core before it is immersed in the coating bath. The rotation of the core, or other article, while it is in the magnetic field of the coil 16, assures uniform internal heating thereof throughout its entirety. A heating device of this character is particularly adapted to be associated in close proximity to the coating bath because the coil itself radiates substantially no heat and therefore does not cause ignition of the coating bath or excessive evaporation thereof.

After the steering wheel core or other article has been heated to a desired temperature, the lever 32 is rotated in a counter-clockwise direction so as to immerse the steering wheel core in the coating bath. Rotation of the wheel while it is immersed in the bath assures an equal distribution of the coating composition over the entire surface of the core. The lever 32 is then turned toward its uppermost position so as to return the core to the magnetic field of the coil. If desired, upward movement of the rod 25 may be arrested when the wheel is midway between the coating bath and the heating device and rotation of the wheel may be continued while the core is in this position so as to remove excess coating composition therefrom by centrifugal force.

The core 41 is subjected to alternate immersions and heat treatments in this manner so as to build up successive layers of the coating compositions on the surface of the steering wheel core. When a rubber coating composition is employed the heat treatments between successive immersions of the article in the coating bath are preferably of long enough duration to firmly set one layer of the composition before the next layer is applied. After the coating has been built up to a desired thickness the steering wheel core may be allowed to remain in the field of the coil 16 until the composition has been cured to a hard rubber state or the coated wheel may be removed from the machine and placed in an oven for the purpose of completing the curing operation. When enamel or other coatings requiring heat drying or baking are used as a coating composition they may be partially dried in the above manner between successive immersion of the core in the bath and the enamel may be finally baked by allowing the core to remain in the field of the coil, or by removing the core and placing it in a baking oven, as desired.

Although but one specific embodiment of our invention is herein shown and described, it will be understood that various changes in the size, shape, and arrangement of parts may be made without departing from the spirit of our invention, and it is not our intention to limit its scope other than by the terms of the appended claims.

What we claim is:

1. A coating forming machine including a coating bath receptacle having an open side, a heating device registering with the open side of said receptacle including a pancake induction coil having one side substantially parallel to the open side of said receptacle, a shiftable support having means located between said heating device and the open side of said receptacle for detachably securing an article to said support, apparatus for reciprocating said support so as to alternately immerse said article in a coating bath and subject the same to a heat treatment, and means for rotating said article while it is immersed in said bath and during said heat treatment.

2. A device for forming coatings on articles including a supporting structure having a base portion and a spaced superimposed casing having an open lower side, a coating bath receptacle on said base portion having an open side registering with the open side of said casing, a substantially vertically shiftable member journaled on said casing having means on one end for detachably securing an article thereto, heating apparatus in said casing including an induction coil having one side located above the detachable securing means of said shiftable member adapted to internally heat said article when said shiftable member is in its uppermost position, all portions of said induction coil being radially misaligned with said article, means for reciprocating said shiftable member so as to alternately immerse said article in said bath and subject said article to a heat treatment, and power driven mechanism for continuously rotating said shiftable member and said article while it is immersed in said bath and while it is subjected to said heating apparatus.

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